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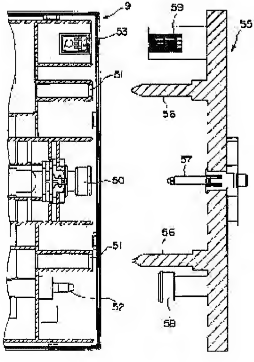
(54) INK CARTRIDGE FOR RECORDING APPARATUS AND INK-JET RECORDING APPARATUS



(57)Abstract:

PROBLEM TO BE SOLVED: To improve an accuracy of positioning mechanical and electrical connecting mechanisms when an ink cartridge is set to a cartridge holder.

SOLUTION: An ink pack having ink sealed inside is constituted so that the ink is guided out to the recording apparatus by an action of the pressurized air introduced in a cartridge case. A circuit board 53 with a data storage for managing the ink sealed in the cartridge is set to part of the cartridge case. A pair of opening holes 51, an ink lead-out port 50 from the ink pack, an introduction port 52 for the pressurized air and a connecting terminal of the circuit board 53 having the data storage are concentratedly arranged to one face of the case.

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CLAIMS

[Claim(s)]

[Claim 1] The ink pack with which it was formed with the flexible material and ink was enclosed with the interior, Contain said ink pack and it is constituted by the cartridge case formed in the airtight condition. It is the ink cartridge for recording devices accomplished so that pressurization air might be introduced in said case in the loading condition to a recording device. The ink cartridge for recording devices which comes to arrange the connection terminal of the circuit board which equipped the whole surface of said cartridge case with the positioning means in the case of loading a recording device, ink derivation opening from an ink pack, the inlet of pressurization air, and the data storage means.

[Claim 2] Said positioning means is the ink cartridge for recording devices according to claim 1 constituted by the opening hole formed so that the gage pin arranged at the recording device could be surrounded.

[Claim 3] The ink cartridge for recording apparatus according to claim 2 which it comes to arrange at two places to which the opening hole which constitutes said positioning means met the longitudinal direction in said whole surface of a case.

[Claim 4] The ink cartridge for recording apparatus of each opening hole arranged at said two places according to claim 3 which comes to arrange ink derivation opening from an ink pack in pars intermedia mostly.

[Claim 5] The ink cartridge for recording apparatus according to claim 3 or 4 which comes to arrange the connection terminal of the circuit board, and the inlet of pressurization air on both the outsides of each opening hole arranged at said two places, respectively.

[Claim 6] The ink jet type recording apparatus constituted in the condition of having loaded with the ink cartridge using the positioning means which is the ink jet type recording apparatus with which it is equipped with an ink cartridge according to claim 1 to 5, and has been arranged at the whole surface of said cartridge case so that the connection terminal of the circuit board might be located in the upper part of the gravity direction to said ink derivation opening.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention is used for an ink jet type recording device, and relates to the ink jet type recording device using the ink cartridge and this which were constituted so that ink might be supplied to a recording head side by impressing the pneumatic pressure generated

by the air booster pump.
[0002]
[Description of the Prior Art] It has the ink jet type recording head which an ink jet type recording apparatus is generally carried on carriage, and moves crosswise [of a record form], and the paper feed means to which a record form is moved relatively [direction / which goes direct to the migration direction of a recording head], and printing is performed to a record form by making an ink droplet breathe out from a recording head based on print data.
[0003] On the other hand, in order to make it correspond to comparatively a lot of printing in this kind with which for example, for office or business use is provided of recording device, it will be necessary to arrange a mass ink cartridge, for this reason the recording device of the format of making the cartridge holder arranged for example, at the body side of equipment loading with an ink cartridge is offered. And a subtank is arranged on the carriage with which the recording head was carried, and ink is supplied from said each ink cartridge through an ink supply tube to each subtank, respectively, and it is constituted so that ink may be further supplied from each subtank to a recording head, respectively.
[0004]
[Problem(s) to be Solved by the Invention] By the way, the large-sized recording device with a long scan distance of carriage which can be printed to bigger space in these days is demanded. In such a recording device, in order to raise a throughput, in the recording head, many nozzle-ization is attained increasingly. Furthermore, in order to raise a throughput, it makes it possible to supply ink from an ink cartridge serially to each subtank carried in carriage, performing printing, and a recording device which is stabilized and supplies ink from each subtank to a recording head, respectively is called for.
[0005] It is necessary to a subtank to connect an ink supply tube from an ink cartridge corresponding to each ink, and in such a recording apparatus, since the scan distance of carriage is large, the leading-about distance of a tube increases inevitably. And since many nozzle-ization is attained in the recording head as described above, there is much consumption of ink, the dynamic pressure (pressure loss) of ink increases into each ink supply tube connected to the subtank from the ink cartridge, and the technical technical problem that the amounts of supply of the ink to a subtank run short is held.
[0006] As one means for solving such a technical problem, pneumatic pressure is impressed for example, to an ink cartridge side, a compulsory ink style is generated from an ink cartridge with pneumatic pressure to a subtank, and the configuration which supplies required sufficient ink to a subtank can adopt.
[0007] It is fabricated so that the case which constitutes an outline may be airtight as an ink cartridge used for the recording apparatus of a configuration as described above, and the configuration by which the ink pack formed with the flexible material which enclosed ink with the interior was contained can adopt suitably. Ink is extruded by the pressurization air impressed in a case, and the ink pack in the ink cartridge in such a configuration acts so that it may be sent out to the recording head side carried in carriage.
[0008] On the other hand, in recent years, the applicability of this kind of recording device is expanded, and diversification of higher definition printing image quality being searched for is progressing. Employment of the class of ink used for a recording apparatus also being diversified in connection with this, exchanging cartridges according to the contents of printing, and performing printing has come to accomplish. Therefore, in order to manage a class, a residue, etc. of ink of each ink cartridge, the proposal of the ink cartridge which carried the semi-

conductor storage means in which the read-out writing of data is possible is also accomplished.
[0009] Therefore, the function to introduce pressurization air and to send out ink as described above, [when an ink cartridge which carries a semi-conductor storage means and performs transfer of data between the bodies of a recording apparatus is used and the cartridge holder of a recording apparatus is loaded with this] Derivation of ink is enabled at installation and coincidence of pressurization air, and in order to deliver and receive data with a semi-conductor storage means further, the configuration which accomplishes connection of the circuit board etc. to coincidence is needed.
[0010] In this case, in order to make some structural and electric connection accomplish, the precision of positioning in the case of loading with a cartridge into a holder serves as an important technical problem. Moreover, since it has the function which extrudes ink compulsorily with pressurization air, even if ink leakage etc. occurs according to a certain failure, it is necessary to adopt a means to avoid effectively the problem of making a part for the connection terminal area of the above mentioned circuit board pollute etc.
[0011] Even if it receives a certain failure and ink leakage occurs from a cartridge, this invention aims at offering the ink jet type recording device using the ink cartridge and this which can avoid effectively the contamination for a connection terminal area of the circuit board, while it offers the positioning device which is made based on such a technical technical problem, and is certainly made in structural and electric connection.
[0012] [Means for Solving the Problem] The ink cartridge for recording apparatus concerning this invention made in order to attain the above mentioned purpose The ink pack with which it was formed with the flexible material and ink was enclosed with the interior, Contain said ink pack and it is constituted by the cartridge case formed in the airtight condition. It is the ink cartridge for recording devices accomplished so that pressurization air might be introduced in said case in the loading condition to a recording device. It considers as the configuration which has arranged the positioning means in the case of loading a recording device, ink derivation opening from an ink pack, the inlet of pressurization air, and the connection terminal of the circuit board equipped with the data storage means on the whole surface of said cartridge case.
[0013] In this case, said positioning means is constituted by the opening hole formed so that the gage pin arranged preferably at the recording device could be surrounded. And in the gestalt of desirable operation, the opening hole which constitutes said positioning means is arranged two in alignment with the longitudinal direction in said whole surface of a case, and is considered as the configuration of each opening hole by which ink derivation opening from an ink pack has been arranged mostly in pars intermedia. Furthermore, the connection terminal of the circuit board and the inlet of pressurization air are considered as the configuration arranged, respectively on both the outsides of each opening hole arranged preferably at two places.
[0014] According to the ink cartridge constituted as mentioned above, on the whole surface of a cartridge case Since the positioning means in the case of loading a recording device is arranged, and the connection terminal of the circuit board which equipped said whole surface with ink derivation opening from an ink pack, the inlet of pressurization air, and the data storage means focuses and is similarly arranged By positioning said whole surface of a cartridge case by the positioning means, the alignment of each structural and electric attachment is also made correctly, and can raise positioning accuracy.
[0015] And said positioning means given to a cartridge case is constituted by the opening hole formed so that the gage pin arranged at the recording device could be surrounded, and since this opening hole is considered as the configuration arranged two in alignment with the longitudinal

direction in said whole surface of a case, it can attain positioning of the direction of three dimensions of a cartridge according to an operation with two gage pins arranged at a recording device.

[0016] In the ink jet type recording apparatus loaded with the above mentioned ink cartridge on the other hand, in the condition of having loaded with the ink cartridge using said positioning means arranged at the whole surface of a cartridge case, it is constituted so that the connection terminal of the circuit board may be located in the upper part of the gravity direction to ink derivation opening.

[0017] Since it is loaded with a cartridge to a recording apparatus with such physical relationship, even if it receives a certain failure and ink leakage occurs from ink derivation opening of a cartridge, a part for the connection terminal area of the circuit board is avoidable from the contamination in leakage ink. Therefore, normal actuation of a recording device can be secured and it can contribute to offering the recording device excellent in dependability.

[0018]

[Embodiment of the Invention] The recording device which uses the ink cartridge concerning this invention hereafter is explained based on the gestalt of operation shown in drawing. Drawing 1 shows the basic configuration of a recording device with a top view first. The sign 1 in drawing 1 shows carriage, and through the timing belt 3 driven by the carriage motor 2, this carriage 1 is constituted so that it may show around at the scan guide member 4 and both-way migration may be carried out in the main scanning direction which is the longitudinal direction of the paper feed member 5, i.e., the cross direction of a record form. And although not shown in drawing 1 , the ink jet type recording head 6 mentioned later is carried in the field which counters the paper feed member 5 of carriage 1.

[0019] Moreover, the subtanks 7a-7d for supplying ink are carried in said recording head at carriage 1. In the gestalt of this operation, in order to store each ink temporarily in that interior, corresponding to each ink, four of these subtanks 7a-7d are provided. And respectively through the flexible ink supply tubes 10 and 10 and ...., Maine tanks 9a-9d as an ink cartridge with which the cartridge holder 8 arranged at the body of equipment was loaded are consisted of by each of these subtanks 7a-7d so that each ink of Black, yellow, a Magenta, and cyanogen may be supplied. In addition, the outline configuration is formed in the shape of flat so that it may explain to a detail later, and in said cartridge holder 8, it is equipped with each above mentioned Maine tanks 9a-9d as an ink cartridge in the condition every so-called length so that a flat-like side may be perpendicularly suitable, respectively.

[0020] On the other hand, the capping means 11 which can close the nozzle forming face of a recording head is arranged in the non-printing area on the moving trucking of said carriage 1 (home POJON), and cap member 11a further formed in the top face of this capping means 11 with flexible materials, such as rubber which can close the nozzle forming face of said recording head, is arranged. And when carriage 1 moves to home POJON, it is constituted by said cap member 11a so that the nozzle forming face of a recording head can be closed.

[0021] This cap member 11a closes the nozzle forming face of a recording head during the idle period of a recording device, and functions as a lid which prevents desiccation of a nozzle orifice. Moreover, although not shown in drawing at this cap member 11a, the end of the tube in a suction pump (tube pump) is connected, and the negative pressure by the suction pump is made to act on a recording head, and it is constituted so that cleaning actuation which carries out suction discharge of the ink from a recording head may be performed. And the printing area side of the capping means 11 is adjoined, and the wiping member 12 by elastic materials, such as

rubber, is arranged, and it is constituted so that the nozzle forming face of a recording head can be wiped away and cleaned if needed.
[0022] Next, drawing 2 is explained with drawing 1 which showed typically the configuration of the ink distribution system carried in the recording device shown in drawing 1 , and showed each part which carries out considerable about this ink distribution system, respectively with the same sign. The air which the sign 21 shows the air booster pump and was pressurized by this air booster pump 21 in drawing 1 and drawing 2 Each Maine tanks 9a-9d (it may represent in drawing 2 , and it is shown as a sign 9, it may represent below, and may only explain as a sign 9) which the pressure regulating valve 22 was supplied and were further described above through the pressure sensor 23 It is constituted so that it may be supplied, respectively. In addition, said pressure regulating valve 22 has the function to make the predetermined range maintain the pneumatic pressure which opens a pressure wide and joins each Maine tanks 9a-9d, when the pneumatic pressure pressurized by the air booster pump 21 reaches more than predetermined.
[0023] Furthermore, said pressure sensor 23 detects the pneumatic pressure pressurized by the air booster pump 21, and functions as controlling the drive of the air booster pump 21. That is, when it is detected that the pneumatic pressure pressurized by the air booster pump 21 reached the predetermined pressure, while stopping the drive of the air booster pump 21, when having become below the pressure as which pneumatic pressure was determined by the pressure sensor 23 is detected, it controls to make the air booster pump 21 drive. Therefore, the pneumatic pressure which joins each Maine tanks 9a-9d described above by this repeat is made as [maintain / in the predetermined range].
[0024] Although later mentioned about the detailed configuration of the ink cartridge as said Maine tank 9, as the outline configuration was shown in drawing 2 , the outline case is formed in the airtight condition, and the ink pack 24 formed in the interior with the flexible material which enclosed ink is contained. And the space formed in the Maine tank 9 and the ink pack 24 constitutes the pressure room 25, and it is constituted so that the pressurization air which minded said pressure sensor 23 in this pressure room 25 may be supplied.
[0025] By this configuration, each ink pack 24 contained by each Maine tanks 9a-9d receives pressurization with pressurization air, respectively, and it accomplishes it so that the ink style by the predetermined pressure may occur from each Maine tanks 9a-9d to each subtanks 7a-7d.
[0026] In addition, the ink pressurized in said each Maine tanks 9a-9d .... and each ink supply tubes 10 and 10, and .. are minded, respectively. respectively -- each ink supply bulbs 26 and 26 -- Each subtanks 7a-7d (it may represent in drawing 2 , and it is shown as a sign 7, it may represent below, and may only explain as a sign 7) carried in carriage 1 It is constituted so that it may be supplied.
[0027] As shown in drawing 2 , the float member 31 is arranged inside at the subtank 7, and the permanent magnet 32 is attached in a part of the float member 31. And a substrate 34 is equipped with the galvanomagnetic devices 33a and 33b represented by the hall device, and the splice is carried out to the side attachment wall of the subtank 7. According to the amount of line of magnetic force by the permanent magnet 32 arranged by this configuration at the float member 31, and said permanent magnet 32 according to the surfacing location of a float member, an amount detection means of ink by which an electrical output is generated by said hall devices 33a and 33b is constituted.
[0028] When it follows, for example, the amount of ink in the subtank 7 decreases, the location of the float member 31 contained in the subtank moves in the gravity direction, and also moves the location of said permanent magnet 32 in the gravity direction in connection with this. So, the

electrical output of the hall devices 33a and 33b by migration of a permanent magnet can be sensed as an amount of ink in the subtank 7, and said ink supply bulb 26 is opened by the electrical output obtained by hall devices 33a and 33b.

[0029] Thereby, the ink currently pressurized within the Maine tank 9 is sent out according to an individual in each subtank 7 by which the amount of ink fell. And when the amount of ink in the subtank 7 concerned reaches a predetermined capacity, based on the electrical output of the above mentioned hall devices 33a and 33b, clausilium of said ink supply bulb 26 is carried out. It acts so that ink may be intermittently supplied from the Maine tank to a subtank by such repeat, and in each subtank, it is made as [store / the ink of the always almost fixed range].

[0030] And from each subtank 7, it is constituted so that ink may be supplied to a recording head 6 through the tube 36 connected to a bulb 35 and this, and based on the print data supplied to the actuator which a recording head 6 does not illustrate, from nozzle orifice 6a formed in the nozzle forming face of a recording head 6, it acts so that an ink droplet may be breathed out. In addition, in drawing 2 , the sign 11 shows the above mentioned capping means, and the tube connected to this capping means 11 is connected to the suction pump (tube pump) which is not illustrated.

[0031] Drawing 3 thru/or drawing 5 show the example of the Maine tank 9 described above as an ink cartridge used for the ink jet type recording apparatus constituted as mentioned above. In addition, drawing 3 is the perspective view having shown the whole Maine tank configuration, and drawing 4 is the expanded sectional view of the Maine tank of a **** condition from the A-A line shown in drawing 3 to the direction of an arrow head. Moreover, drawing 5 is the perspective view having shown the configuration of the ink pack 24 contained in the outline case shown in drawing 3 . First, the outline case is constituted by the upper case 41 and the bottom case 42 as shown in drawing 3 and drawing 4 . The bottom case 42 is made by the flat-like box type configuration, and it is constituted so that the ink pack 24 (refer to drawing 5) in the condition of the top face having been opened wide and having enclosed ink with the interior can be contained.

[0032] As shown in drawing 4 , in order to press down four sides each of the ink pack 24 contained by the bottom case 42 in the gestalt of this operation the inside lid 43 of the quadrilateral by which opening of the center section was carried out to the shape of an aperture is inserted, and it was further formed in the opening edge of the bottom case 42 -- it flange 42a sets, as the thick wire showed, heat joining of the film member 44 is carried out, and it is blockaded so that the bottom case 42 may be airtight. And it considers as the configuration equipped with the upper case 41 accomplished in the flat box type configuration from the upper part.

[0033] By forming wedge-shaped claw part 41a in said upper case 41 intermittently in accordance with the inside, and stuffing the upper case 41 into it to the bottom case 42, it engages with said flange 42a by which said each claw part 41a was formed in the opening edge of the bottom case 42, and both are combined with one. Since it is located by it as the splice of the film member 44 is carried out in accordance with the inside of the upper case 41 when pressurization air is introduced in the bottom case 42 blockaded by the film member 44 by this configuration, it is avoidable that the film member 44 bulges outside in response to pressurization air.

[0034] Drawing 5 shows the configuration of the ink pack 24 contained in the outline case which is the above, and is made and formed. The flexible material of two sheets formed in the shape of a rectangle, for example, a polyethylene film, is used, and for example, aluminum Tomari etc. laminates this ink pack 24 on the front face for improvement in gas barrier property. And the plug 50 in the side edge section of a longitudinal direction which constitutes ink derivation

opening is mostly attached in the center section.
[0035] It is first joined by heat joining and three sides of the side edge section in which said plug 50 was attached, and the both-sides edge of the longitudinal direction which intersects perpendicularly with this are formed in saccate. In addition, sign 24b shows a part for the heat welding given to said three sides. And using opening in the one remaining sides in the ink pack 24 formed in saccate as was the above, ink is introduced in the ink pack 24, the one remaining sides are joined to the last by heat joining, and it considers as the condition that ink was enclosed in the ink pack. In addition, sign 24c shows a part for the heat welding given to said one remaining sides.
[0036] As the Maine tank 9 as an ink cartridge constituted as mentioned above was shown in drawing 3 , the opening hole 51 of the pair as a positioning means used for the whole surface of a cartridge case when loading a recording device is formed. The opening hole 51 of this pair is arranged in the condition of having estranged to two in alignment with the longitudinal direction in said whole surface of a case, and this is formed in coincidence at one, when carrying out injection molding of the bottom case 42, for example. Moreover, mostly, said plug 50 of the positioning opening hole 51 arranged at said two places which constitutes ink derivation opening from an ink pack is attached in pars intermedia, where the O ring for airtight which is not illustrated is bit.
[0037] And the inlet 52 of pressurization air and the circuit board 53 explained to a detail later are arranged on both the outsides of each opening hole 51 arranged at said two places, respectively. In addition, the inlet 52 of pressurization air is fabricated by coincidence in the shape of hollow at one, when fabricating the bottom case 42, and it is constituted so that pressurization air can be introduced in the bottom case 42 blockaded by the film member 44 through this.
[0038] The edge by the side of said whole surface of the Maine tank 9 as an ink cartridge formed in drawing 6 as described above is shown in the state of the cross section, and the condition of being equipped with the Maine tank 9 to the attachment 55 arranged at the cartridge holder 8 by the side of a recording apparatus is shown. Moreover, the attachment 55 arranged at the cartridge holder 8 side is shown in drawing 7 in the state of the perspective view. As shown in drawing 6 and drawing 7 , the gage pin 56 of the pair formed in the shape of a cylinder is arranged at the cartridge holder 8 side, and it is constituted so that the positioning opening hole 51 of said pair formed in the Maine tank 9 side may surround each gage pin 56 and it may be equipped with it.
[0039] Thus, since it considers as the configuration arranged at two places to which the opening hole 51 for positioning met the longitudinal direction in said whole surface of a case at the cartridge side, wearing in the end face section of two locator pins 56 arranged at the recording apparatus side can attain positioning of the direction of three dimensions of the Maine tank 9 as a cartridge. By being equipped with the Maine tank 9 to said gage pin 56, the ink delivery tube 57 of the shape of hollow which sandwiches the gage pin 56 of a pair mostly arranged in the center section is inserted in said plug 50 which constitutes ink derivation opening from an ink pack, and is made with the attitude which can derive ink from a cartridge.
[0040] Moreover, it connects with the sending-out opening 58 of pressurization air with which the inlet 52 of pressurization air has been arranged at the holder 8 side by wearing of the Maine tank 9, and is made by the attitude which can introduce pressurization air into the Maine tank 9 side. Furthermore, the terminal device 59 equipped with two or more contact segments to said circuit board 53 arranged at the Maine tank 9 side is connected, and it is made by the attitude that transfer of data is realizable, between semi-conductor storage means with which the circuit board

53 was equipped to mention later. In addition, when the cartridge holder 8 is equipped with the Maine tank 9, a condition is equipped with said circuit board 53 arranged at the Maine tank 9 side as shown in drawing 6 every [which carries out in the gravity direction and is located in the upper part] length.

[0041] Drawing 8 is inserted in said plug 50 with which the ink delivery tube 57 of the shape of hollow arranged by wearing of the Maine tank 9 at the holder side constitutes ink derivation opening from an ink pack, and a sectional view shows the condition of being made as [derive / from a cartridge / ink]. In addition, drawing 8 (A) shows the condition before connecting both, and drawing 8 (B) shows the condition that both were connected. Rubber packing 50a formed in the shape of a circular ring is inserted in the outlet part in said plug 50 by the side of an ink pack. On the other hand, in the plug 50, movable object 50b made as [carry out / to shaft orientations / it / movable] is contained. And said good dynamic body 50b is constituted so that the center section of the shape of a circular ring in said rubber packing 50a may be blockaded according to the energization force of coiled form spring member 50c. Moreover, opening 57a is formed in the side face near the point at the ink delivery tube 57 of the shape of hollow arranged at the holder 8 side.

[0042] Therefore, in the condition of drawing 8 (A) that a recording apparatus side is not equipped with the Maine tank 9 as a cartridge, since movable object 50b blockades the center section of the shape of a circular ring in rubber packing 50a, a plug 50 is made a clausilium condition by the energization force of coiled form spring member 50c, and can prevent exsorption of the ink from an ink pack according to it. moreover, when a recording device is equipped with the Maine tank 9, it is shown in drawing 8 (B) -- as -- the point of the ink delivery tube 57 -- the energization force of said spring member 50c -- resisting -- movable object 50b -- the interior -- **** -- in order to act like, the ink passage shown by the arrow head is formed, and it is made as [draw / ink]. In addition, in this case, the bore section of the shape of a circular ring in rubber packing 50a sticks to the appearance section of the ink delivery tube 57, and is made as [prevent / exsorption of the ink from the part concerned].

[0043] Next, drawing 9 shows the wearing condition of said circuit board 53 arranged at the cartridge side, and drawing 10 shows the appearance configuration of the circuit board 53. In addition, (A) in drawing 10 shows the circuit board 53 with the **** perspective view from the transverse-plane side, and (B) shows the circuit board 53 with the **** perspective view from the rear-face side. As shown in drawing 9 , the circuit board 53 is attached in the inner pars basilaris ossis occipitalis by which the second page which intersects perpendicularly was opened wide in the corner of the bottom case 42 of a cartridge. The whole surface opened wide is made as [connect / with the terminal device 59 arranged at said cartridge holder 8 side / the circuit board 53], and other whole surface opened wide is used when mainly equipping a cartridge case with the circuit board 53.

[0044] That is, through tube 53a for equipping the bottom case 42 with the circuit board 53, as shown in drawing 10 , and notch hole 53b are formed in the circuit board. And the projections 42c and 42d for heat joining inserted in said through tube 53a and notch hole 53b as the imaginary line showed to drawing 10 (A) are beforehand formed in the bottom case 42. It faces equipping the bottom case 42 with said circuit board 53 mostly formed in the shape of a rectangle, and the circuit board 53 is inserted in cavity 42b formed in order to position the circuit board, as shown in drawing 9 . And by making the heater chip which is not illustrated contact the projections [for heat joining / 42c and 42d] crowning shown by the imaginary line, and carrying out thermofusion to drawing 10 (A), as shown in drawing 9 , the bottom case 42 can be equipped

with the circuit board 53.
[0045] Thus, in order to equip the bottom case 42 with the circuit board 53, the heater chip described above as a fixture for wearing is used, and it is made as [insert / from the whole surface opened wide at the top-face side of the circuit board 53 / the tip of said heater chip]. In addition, as shown in drawing 10 (A), when a cartridge holder is equipped, electrode contact 53c as a connection terminal electrically contacted with said terminal device 59 by the side of a holder 8 is formed in the transverse-plane side of the circuit board 53. Moreover, 53d of electrode contacts for a check formed in the circle configuration is also formed in the same side.
[0046] and it connect with the semi-conductor storage means 54 in which the read-out writing of the data arrange at the rear face of the circuit board 53 be possible, and in the condition of having equip the cartridge holder of a recording apparatus with the Maine tank 9, these electrode contacts 53c and 53d be constitute so that the transfer of data, such as a class of ink, an ink residue, a serial number, and an expiration date, by which the Maine tank enclosure be carried out may be make.
[0047]
[Effect of the Invention] By the above explanation, according to the ink cartridge for recording apparatus concerning this invention, so that clearly The positioning means in the case of loading a recording device at the whole surface of a cartridge case is arranged. Since ink derivation opening from an ink pack, the inlet of pressurization air, and the connection terminal of the circuit board equipped with the data storage means focus on said whole surface and it is similarly arranged By positioning said whole surface of a cartridge case by the positioning means, the alignment of structural and electric attachment is also made correctly. Positioning accuracy can be raised by this and the dependability of actuation of this kind of recording device can be raised.
[0048] Moreover, it sets in the condition of having loaded with the ink cartridge using said positioning means arranged at the whole surface of a cartridge case according to the ink jet type recording apparatus concerning this invention. Since it accomplishes so that the connection terminal of the circuit board may be located in the upper part of the gravity direction to ink derivation opening, even if it receives a certain failure and ink leakage occurs from ink derivation opening, a part for the connection terminal area of the circuit board is avoidable from the contamination in leakage ink. Therefore, normal actuation of a recording device is securable.

TECHNICAL FIELD

[Field of the Invention] This invention is used for an ink jet type recording device, and relates to the ink jet type recording device using the ink cartridge and this which were constituted so that ink might be supplied to a recording head side by impressing the pneumatic pressure generated by the air booster pump.

PRIOR ART

[Description of the Prior Art] It has the ink jet type recording head which an ink jet type recording apparatus is generally carried on carriage, and moves crosswise [of a record form], and the paper feed means to which a record form is moved relatively [direction / which goes direct to the migration direction of a recording head], and printing is performed to a record form by making an ink droplet breathe out from a recording head based on print data.
[0003] On the other hand, in order to make it correspond to comparatively a lot of printing in this kind with which for example, for office or business use is provided of recording device, it will be necessary to arrange a mass ink cartridge, for this reason the recording device of the format of making the cartridge holder arranged for example, at the body side of equipment loading with an ink cartridge is offered. And a subtank is arranged on the carriage with which the recording head was carried, and ink is supplied from said each ink cartridge through an ink supply tube to each subtank, respectively, and it is constituted so that ink may be further supplied from each subtank to a recording head, respectively.

EFFECT OF THE INVENTION

[Effect of the Invention] According to the ink cartridge for recording apparatus which starts this invention by the above explanation so that clearly The alignment of structural and electric attachment is also correctly made by arranging the positioning means in the case of loading a recording device at the whole surface of a cartridge case, and similarly, positioning said whole surface of a cartridge case by the positioning means, since ink derivation opening from an ink pack, the inlet of pressurization air, and the connection terminal of the circuit board equipped with the data storage means focus on said whole surface and are arranged at it. Positioning accuracy can be raised by this and the dependability of actuation of this kind of recording device can be raised.
[0048] Moreover, according to the ink jet type recording apparatus concerning this invention, it sets in the condition of having loaded with the ink cartridge using said positioning means arranged at the whole surface of a cartridge case, Since it accomplishes so that the connection terminal of the circuit board may be located in the upper part of the gravity direction to ink derivation opening, even if it receives a certain failure and ink leakage occurs from ink derivation opening, a part for the connection terminal area of the circuit board is avoidable from the contamination in leakage ink. Therefore, normal actuation of a recording device is securable.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] By the way, the large-sized recording device with a long scan distance of carriage which can be printed to bigger space in these days is demanded. In such a recording device, in order to raise a throughput, in the recording head, many nozzle-ization is attained increasingly. Furthermore, in order to raise a throughput, it makes it possible to supply ink from an ink cartridge serially to each subtank carried in carriage, performing

printing, and a recording device which is stabilized and supplies ink from each subtank to a recording head, respectively is called for.
[0005] It is necessary to a subtank to connect an ink supply tube from an ink cartridge corresponding to each ink, and in such a recording apparatus, since the scan distance of carriage is large, the leading-about distance of a tube increases inevitably. And since many nozzle-ization is attained in the recording head as described above, there is much consumption of ink, the dynamic pressure (pressure loss) of ink increases into each ink supply tube connected to the subtank from the ink cartridge, and the technical technical problem that the amounts of supply of the ink to a subtank run short is held.
[0006] As one means for solving such a technical problem, pneumatic pressure is impressed for example, to an ink cartridge side, a compulsory ink style is generated from an ink cartridge with pneumatic pressure to a subtank, and the configuration which supplies required sufficient ink to a subtank can adopt.
[0007] It is fabricated so that the case which constitutes an outline may be airtight as an ink cartridge used for the recording apparatus of a configuration as described above, and the configuration by which the ink pack formed with the flexible material which enclosed ink with the interior was contained can adopt suitably. Ink is extruded by the pressurization air impressed in a case, and the ink pack in the ink cartridge in such a configuration acts so that it may be sent out to the recording head side carried in carriage.
[0008] On the other hand, in recent years, the applicability of this kind of recording device is expanded, and diversification of higher definition printing image quality being searched for is progressing. Employment of the class of ink used for a recording apparatus also being diversified in connection with this, exchanging cartridges according to the contents of printing, and performing printing has come to accomplish. Therefore, in order to manage a class, a residue, etc. of ink of each ink cartridge, the proposal of the ink cartridge which carried the semi-conductor storage means in which the read-out writing of data is possible is also accomplished.
[0009] Therefore, the function to introduce pressurization air and to send out ink as described above, [when an ink cartridge which carries a semi-conductor storage means and performs transfer of data between the bodies of a recording apparatus is used and the cartridge holder of a recording apparatus is loaded with this] Derivation of ink is enabled at installation and coincidence of pressurization air, and in order to deliver and receive data with a semi-conductor storage means further, the configuration which accomplishes connection of the circuit board etc. to coincidence is needed.
[0010] In this case, in order to make some structural and electric connection accomplish, the precision of positioning in the case of loading with a cartridge into a holder serves as an important technical problem. Moreover, since it has the function which extrudes ink compulsorily with pressurization air, even if ink leakage etc. occurs according to a certain failure, it is necessary to adopt a means to avoid effectively the problem of making a part for the connection terminal area of the above mentioned circuit board pollute etc.
[0011] Even if it receives a certain failure and ink leakage occurs from a cartridge, this invention aims at offering the ink jet type recording device using the ink cartridge and this which can avoid effectively the contamination for a connection terminal area of the circuit board, while it offers the positioning device which is made based on such a technical technical problem, and is certainly made in structural and electric connection.

MEANS

[Means for Solving the Problem] The ink cartridge for recording apparatus concerning this invention made in order to attain the above mentioned purpose The ink pack with which it was formed with the flexible material and ink was enclosed with the interior, Contain said ink pack and it is constituted by the cartridge case formed in the airtight condition. It is the ink cartridge for recording devices accomplished so that pressurization air might be introduced in said case in the loading condition to a recording device. It considers as the configuration which has arranged the positioning means in the case of loading a recording device, ink derivation opening from an ink pack, the inlet of pressurization air, and the connection terminal of the circuit board equipped with the data storage means on the whole surface of said cartridge case.

[0013] In this case, said positioning means is constituted by the opening hole formed so that the gage pin arranged preferably at the recording device could be surrounded. And in the gestalt of desirable operation, the opening hole which constitutes said positioning means is arranged two in alignment with the longitudinal direction in said whole surface of a case, and is considered as the configuration of each opening hole by which ink derivation opening from an ink pack has been arranged mostly in pars intermedia. Furthermore, the connection terminal of the circuit board and the inlet of pressurization air are considered as the configuration arranged, respectively on both the outsides of each opening hole arranged preferably at two places.

[0014] According to the ink cartridge constituted as mentioned above, on the whole surface of a cartridge case Since the positioning means in the case of loading a recording device is arranged, and the connection terminal of the circuit board which equipped said whole surface with ink derivation opening from an ink pack, the inlet of pressurization air, and the data storage means focuses and is similarly arranged By positioning said whole surface of a cartridge case by the positioning means, the alignment of each structural and electric attachment is also made correctly, and can raise positioning accuracy.

[0015] And said positioning means given to a cartridge case is constituted by the opening hole formed so that the gage pin arranged at the recording device could be surrounded, and since this opening hole is considered as the configuration arranged two in alignment with the longitudinal direction in said whole surface of a case, it can attain positioning of the direction of three dimensions of a cartridge according to an operation with two gage pins arranged at a recording device.

[0016] In the ink jet type recording apparatus loaded with the above mentioned ink cartridge on the other hand, in the condition of having loaded with the ink cartridge using said positioning means arranged at the whole surface of a cartridge case, it is constituted so that the connection terminal of the circuit board may be located in the upper part of the gravity direction to ink derivation opening.

[0017] Since it is loaded with a cartridge to a recording apparatus with such physical relationship, even if it receives a certain failure and ink leakage occurs from ink derivation opening of a cartridge, a part for the connection terminal area of the circuit board is avoidable from the contamination in leakage ink. Therefore, normal actuation of a recording device can be secured and it can contribute to offering the recording device excellent in dependability.

[0018]

[Embodiment of the Invention] The recording device which uses the ink cartridge concerning this invention hereafter is explained based on the gestalt of operation shown in drawing. Drawing

1 shows the basic configuration of a recording device with a top view first. The sign 1 in drawing 1 shows carriage, and through the timing belt 3 driven by the carriage motor 2, this carriage 1 is constituted so that it may show around at the scan guide member 4 and both-way migration may be carried out in the main scanning direction which is the longitudinal direction of the paper feed member 5, i.e., the cross direction of a record form. And although not shown in drawing 1 , the ink jet type recording head 6 mentioned later is carried in the field which counters the paper feed member 5 of carriage 1.

[0019] Moreover, the subtanks 7a-7d for supplying ink are carried in said recording head at carriage 1. In the gestalt of this operation, in order to store each ink temporarily in that interior, corresponding to each ink, four of these subtanks 7a-7d are provided. And respectively through the flexible ink supply tubes 10 and 10 and ...., Maine tanks 9a-9d as an ink cartridge with which the cartridge holder 8 arranged at the body of equipment was loaded are consisted of by each of these subtanks 7a-7d so that each ink of Black, yellow, a Magenta, and cyanogen may be supplied. In addition, the outline configuration is formed in the shape of flat so that it may explain to a detail later, and in said cartridge holder 8, it is equipped with each above mentioned Maine tanks 9a-9d as an ink cartridge in the condition every so-called length so that a flat-like side may be perpendicularly suitable, respectively.

[0020] On the other hand, the capping means 11 which can close the nozzle forming face of a recording head is arranged in the non-printing area on the moving trucking of said carriage 1 (home POJON), and cap member 11a further formed in the top face of this capping means 11 with flexible materials, such as rubber which can close the nozzle forming face of said recording head, is arranged. And when carriage 1 moves to home POJON, it is constituted by said cap member 11a so that the nozzle forming face of a recording head can be closed.

[0021] This cap member 11a closes the nozzle forming face of a recording head during the idle period of a recording device, and functions as a lid which prevents desiccation of a nozzle orifice. Moreover, although not shown in drawing at this cap member 11a, the end of the tube in a suction pump (tube pump) is connected, and the negative pressure by the suction pump is made to act on a recording head, and it is constituted so that cleaning actuation which carries out suction discharge of the ink from a recording head may be performed. And the printing area side of the capping means 11 is adjoined, and the wiping member 12 by elastic materials, such as rubber, is arranged, and it is constituted so that the nozzle forming face of a recording head can be wiped away and cleaned if needed.

[0022] Next, drawing 2 is explained with drawing 1 which showed typically the configuration of the ink distribution system carried in the recording device shown in drawing 1 , and showed each part which carries out considerable about this ink distribution system, respectively with the same sign. The air which the sign 21 shows the air booster pump and was pressurized by this air booster pump 21 in drawing 1 and drawing 2 Each Maine tanks 9a-9d (it may represent in drawing 2 , and it is shown as a sign 9, it may represent below, and may only explain as a sign 9) which the pressure regulating valve 22 was supplied and were further described above through the pressure sensor 23 It is constituted so that it may be supplied, respectively. In addition, said pressure regulating valve 22 has the function to make the predetermined range maintain the pneumatic pressure which opens a pressure wide and joins each Maine tanks 9a-9d, when the pneumatic pressure pressurized by the air booster pump 21 reaches more than predetermined.

[0023] Furthermore, said pressure sensor 23 detects the pneumatic pressure pressurized by the air booster pump 21, and functions as controlling the drive of the air booster pump 21. That is, when it is detected that the pneumatic pressure pressurized by the air booster pump 21 reached the

predetermined pressure, while stopping the drive of the air booster pump 21, when having become below the pressure as which pneumatic pressure was determined by the pressure sensor 23 is detected, it controls to make the air booster pump 21 drive. Therefore, the pneumatic pressure which joins each Maine tanks 9a-9d described above by this repeat is made as [maintain / in the predetermined range].

[0024] Although later mentioned about the detailed configuration of the ink cartridge as said Maine tank 9, as the outline configuration was shown in drawing 2 , the outline case is formed in the airtight condition, and the ink pack 24 formed in the interior with the flexible material which enclosed ink is contained. And the space formed in the Maine tank 9 and the ink pack 24 constitutes the pressure room 25, and it is constituted so that the pressurization air which minded said pressure sensor 23 in this pressure room 25 may be supplied.

[0025] By this configuration, each ink pack 24 contained by each Maine tanks 9a-9d receives pressurization with pressurization air, respectively, and it accomplishes it so that the ink style by the predetermined pressure may occur from each Maine tanks 9a-9d to each subtanks 7a-7d.

[0026] In addition, the ink pressurized in said each Maine tanks 9a-9d .... and each ink supply tubes 10 and 10, and .. are minded, respectively. respectively -- each ink supply bulbs 26 and 26 -- Each subtanks 7a-7d (it may represent in drawing 2 , and it is shown as a sign 7, it may represent below, and may only explain as a sign 7) carried in carriage 1 It is constituted so that it may be supplied.

[0027] As shown in drawing 2 , the float member 31 is arranged inside at the subtank 7, and the permanent magnet 32 is attached in a part of the float member 31. And a substrate 34 is equipped with the galvanomagnetic devices 33a and 33b represented by the hall device, and the splice is carried out to the side attachment wall of the subtank 7. According to the amount of line of magnetic force by the permanent magnet 32 arranged by this configuration at the float member 31, and said permanent magnet 32 according to the surfacing location of a float member, an amount detection means of ink by which an electrical output is generated by said hall devices 33a and 33b is constituted.

[0028] When it follows, for example, the amount of ink in the subtank 7 decreases, the location of the float member 31 contained in the subtank moves in the gravity direction, and also moves the location of said permanent magnet 32 in the gravity direction in connection with this. So, the electrical output of the hall devices 33a and 33b by migration of a permanent magnet can be sensed as an amount of ink in the subtank 7, and said ink supply bulb 26 is opened by the electrical output obtained by hall devices 33a and 33b.

[0029] Thereby, the ink currently pressurized within the Maine tank 9 is sent out according to an individual in each subtank 7 by which the amount of ink fell. And when the amount of ink in the subtank 7 concerned reaches a predetermined capacity, based on the electrical output of the above mentioned hall devices 33a and 33b, clausilium of said ink supply bulb 26 is carried out. It acts so that ink may be intermittently supplied from the Maine tank to a subtank by such repeat, and in each subtank, it is made as [store / the ink of the always almost fixed range].

[0030] And from each subtank 7, it is constituted so that ink may be supplied to a recording head 6 through the tube 36 connected to a bulb 35 and this, and based on the print data supplied to the actuator which a recording head 6 does not illustrate, from nozzle orifice 6a formed in the nozzle forming face of a recording head 6, it acts so that an ink droplet may be breathed out. In addition, in drawing 2 , the sign 11 shows the above mentioned capping means, and the tube connected to this capping means 11 is connected to the suction pump (tube pump) which is not illustrated.

[0031] Drawing 3 thru/or drawing 5 show the example of the Maine tank 9 described above as an

ink cartridge used for the ink jet type recording apparatus constituted as mentioned above. In addition, drawing 3 is the perspective view having shown the whole Maine tank configuration, and drawing 4 is the expanded sectional view of the Maine tank of a **** condition from the A-A line shown in drawing 3 to the direction of an arrow head. Moreover, drawing 5 is the perspective view having shown the configuration of the ink pack 24 contained in the outline case shown in drawing 3 . First, the outline case is constituted by the upper case 41 and the bottom case 42 as shown in drawing 3 and drawing 4 . The bottom case 42 is made by the flat-like box type configuration, and it is constituted so that the ink pack 24 (refer to drawing 5) in the condition of the top face having been opened wide and having enclosed ink with the interior can be contained.

[0032] As shown in drawing 4 , in order to press down four sides each of the ink pack 24 contained by the bottom case 42 in the gestalt of this operation the inside lid 43 of the quadrilateral by which opening of the center section was carried out to the shape of an aperture is inserted, and it was further formed in the opening edge of the bottom case 42 -- it flange 42a sets, as the thick wire showed, heat joining of the film member 44 is carried out, and it is blockaded so that the bottom case 42 may be airtight. And it considers as the configuration equipped with the upper case 41 accomplished in the flat box type configuration from the upper part.

[0033] By forming wedge-shaped claw part 41a in said upper case 41 intermittently in accordance with the inside, and stuffing the upper case 41 into it to the bottom case 42, it engages with said flange 42a by which said each claw part 41a was formed in the opening edge of the bottom case 42, and both are combined with one. Since it is located by it as the splice of the film member 44 is carried out in accordance with the inside of the upper case 41 when pressurization air is introduced in the bottom case 42 blockaded by the film member 44 by this configuration, it is avoidable that the film member 44 bulges outside in response to pressurization air.

[0034] Drawing 5 shows the configuration of the ink pack 24 contained in the outline case which is the above, and is made and formed. The flexible material of two sheets formed in the shape of a rectangle, for example, a polyethylene film, is used, and for example, aluminum Tomari etc. laminates this ink pack 24 on the front face for improvement in gas barrier property. And the plug 50 in the side edge section of a longitudinal direction which constitutes ink derivation opening is mostly attached in the center section.

[0035] It is first joined by heat joining and three sides of the side edge section in which said plug 50 was attached, and the both-sides edge of the longitudinal direction which intersects perpendicularly with this are formed in saccate. In addition, sign 24b shows a part for the heat welding given to said three sides. And using opening in the one remaining sides in the ink pack 24 formed in saccate as was the above, ink is introduced in the ink pack 24, the one remaining sides are joined to the last by heat joining, and it considers as the condition that ink was enclosed in the ink pack. In addition, sign 24c shows a part for the heat welding given to said one remaining sides.

[0036] As the Maine tank 9 as an ink cartridge constituted as mentioned above was shown in drawing 3 , the opening hole 51 of the pair as a positioning means used for the whole surface of a cartridge case when loading a recording device is formed. The opening hole 51 of this pair is arranged in the condition of having estranged to two in alignment with the longitudinal direction in said whole surface of a case, and this is formed in coincidence at one, when carrying out injection molding of the bottom case 42, for example. Moreover, mostly, said plug 50 of the positioning opening hole 51 arranged at said two places which constitutes ink derivation opening

from an ink pack is attached in pars intermedia, where the O ring for airtight which is not illustrated is bit.
[0037] And the inlet 52 of pressurization air and the circuit board 53 explained to a detail later are arranged on both the outsides of each opening hole 51 arranged at said two places, respectively. In addition, the inlet 52 of pressurization air is fabricated by coincidence in the shape of hollow at one, when fabricating the bottom case 42, and it is constituted so that pressurization air can be introduced in the bottom case 42 blockaded by the film member 44 through this.
[0038] The edge by the side of said whole surface of the Maine tank 9 as an ink cartridge formed in drawing 6 as described above is shown in the state of the cross section, and the condition of being equipped with the Maine tank 9 to the attachment 55 arranged at the cartridge holder 8 by the side of a recording apparatus is shown. Moreover, the attachment 55 arranged at the cartridge holder 8 side is shown in drawing 7 in the state of the perspective view. As shown in drawing 6 and drawing 7 , the gage pin 56 of the pair formed in the shape of a cylinder is arranged at the cartridge holder 8 side, and it is constituted so that the positioning opening hole 51 of said pair formed in the Maine tank 9 side may surround each gage pin 56 and it may be equipped with it.
[0039] Thus, since it considers as the configuration arranged at two places to which the opening hole 51 for positioning met the longitudinal direction in said whole surface of a case at the cartridge side, wearing in the end face section of two locator pins 56 arranged at the recording apparatus side can attain positioning of the direction of three dimensions of the Maine tank 9 as a cartridge. By being equipped with the Maine tank 9 to said gage pin 56, the ink delivery tube 57 of the shape of hollow which sandwiches the gage pin 56 of a pair mostly arranged in the center section is inserted in said plug 50 which constitutes ink derivation opening from an ink pack, and is made with the attitude which can derive ink from a cartridge.
[0040] Moreover, it connects with the sending-out opening 58 of pressurization air with which the inlet 52 of pressurization air has been arranged at the holder 8 side by wearing of the Maine tank 9, and is made by the attitude which can introduce pressurization air into the Maine tank 9 side. Furthermore, the terminal device 59 equipped with two or more contact segments to said circuit board 53 arranged at the Maine tank 9 side is connected, and it is made by the attitude that transfer of data is realizable, between semi-conductor storage means with which the circuit board 53 was equipped to mention later. In addition, when the cartridge holder 8 is equipped with the Maine tank 9, a condition is equipped with said circuit board 53 arranged at the Maine tank 9 side as shown in drawing 6 every [which carries out in the gravity direction and is located in the upper part] length.
[0041] Drawing 8 is inserted in said plug 50 with which the ink delivery tube 57 of the shape of hollow arranged by wearing of the Maine tank 9 at the holder side constitutes ink derivation opening from an ink pack, and a sectional view shows the condition of being made as [derive / from a cartridge / ink]. In addition, drawing 8 (A) shows the condition before connecting both, and drawing 8 (B) shows the condition that both were connected. Rubber packing 50a formed in the shape of a circular ring is inserted in the outlet part in said plug 50 by the side of an ink pack. On the other hand, in the plug 50, movable object 50b made as [carry out / to shaft orientations / it / movable] is contained. And said good dynamic body 50b is constituted so that the center section of the shape of a circular ring in said rubber packing 50a may be blockaded according to the energization force of coiled form spring member 50c. Moreover, opening 57a is formed in the side face near the point at the ink delivery tube 57 of the shape of hollow arranged at the holder 8 side.

[0042] Therefore, in the condition of drawing 8 (A) that a recording apparatus side is not equipped with the Maine tank 9 as a cartridge, since movable object 50b blockades the center section of the shape of a circular ring in rubber packing 50a, a plug 50 is made a clausilium condition by the energization force of coiled form spring member 50c, and can prevent exsorption of the ink from an ink pack according to it. moreover, when a recording device is equipped with the Maine tank 9, it is shown in drawing 8 (B) -- as -- the point of the ink delivery tube 57 -- the energization force of said spring member 50c -- resisting -- movable object 50b -- the interior -- **** -- in order to act like, the ink passage shown by the arrow head is formed, and it is made as [draw / ink]. In addition, in this case, the bore section of the shape of a circular ring in rubber packing 50a sticks to the appearance section of the ink delivery tube 57, and is made as [prevent / exsorption of the ink from the part concerned].
[0043] Next, drawing 9 shows the wearing condition of said circuit board 53 arranged at the cartridge side, and drawing 10 shows the appearance configuration of the circuit board 53. In addition, (A) in drawing 10 shows the circuit board 53 with the **** perspective view from the transverse-plane side, and (B) shows the circuit board 53 with the **** perspective view from the rear-face side. As shown in drawing 9 , the circuit board 53 is attached in the inner pars basilaris ossis occipitalis by which the second page which intersects perpendicularly was opened wide in the corner of the bottom case 42 of a cartridge. The whole surface opened wide is made as [connect / with the terminal device 59 arranged at said cartridge holder 8 side / the circuit board 53], and other whole surface opened wide is used when mainly equipping a cartridge case with the circuit board 53.
[0044] That is, through tube 53a for equipping the bottom case 42 with the circuit board 53, as shown in drawing 10 , and notch hole 53b are formed in the circuit board. And the projections 42c and 42d for heat joining inserted in said through tube 53a and notch hole 53b as the imaginary line showed to drawing 10 (A) are beforehand formed in the bottom case 42. It faces equipping the bottom case 42 with said circuit board 53 mostly formed in the shape of a rectangle, and the circuit board 53 is inserted in cavity 42b formed in order to position the circuit board, as shown in drawing 9 . And by making the heater chip which is not illustrated contact the projections [for heat joining / 42c and 42d] crowning shown by the imaginary line, and carrying out thermofusion to drawing 10 (A), as shown in drawing 9 , the bottom case 42 can be equipped with the circuit board 53.
[0045] Thus, in order to equip the bottom case 42 with the circuit board 53, the heater chip described above as a fixture for wearing is used, and it is made as [insert / from the whole surface opened wide at the top-face side of the circuit board 53 / the tip of said heater chip]. In addition, as shown in drawing 10 (A), when a cartridge holder is equipped, electrode contact 53c as a connection terminal electrically contacted with said terminal device 59 by the side of a holder 8 is formed in the transverse-plane side of the circuit board 53. Moreover, 53d of electrode contacts for a check formed in the circle configuration is also formed in the same side.
[0046] and it connect with the semi-conductor storage means 54 in which the read-out writing of the data arrange at the rear face of the circuit board 53 be possible, and in the condition of having equip the cartridge holder of a recording apparatus with the Maine tank 9, these electrode contacts 53c and 53d be constitute so that the transfer of data, such as a class of ink, an ink residue, a serial number, and an expiration date, by which the Maine tank enclosure be carried out may be make.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the plan having shown an example of the ink jet type recording device which can use the ink cartridge concerning this invention.
[Drawing 2] It is the mimetic diagram having shown the ink distribution system from the ink cartridge in the recording apparatus shown in drawing 1 to a recording head.
[Drawing 3] It is the perspective view having shown the appearance configuration of the ink cartridge concerning this invention.
[Drawing 4] It is the expanded sectional view of the ink cartridge of a **** condition from the A-A line shown in drawing 3 to the direction of an arrow head.
[Drawing 5] It is the perspective view having shown the configuration of the ink pack contained in the cartridge shown in drawing 3 .
[Drawing 6] It is the sectional view having shown the configuration of the attachment arranged at the edge and cartridge holder by the side of the whole surface of an ink cartridge.
[Drawing 7] It is the perspective view having shown the attachment arranged at the cartridge holder.
[Drawing 8] It is the sectional view having shown the configuration of the ink derivation plug by the side of a cartridge, and the ink delivery tube by the side of a cartridge holder.
[Drawing 9] It is the perspective view having expanded and shown the wearing condition of the circuit board with which the cartridge side was equipped.
[Drawing 10] It is the perspective view in which having expanded further the appearance configuration of the circuit board shown in drawing 9 , and having shown it.
[Description of Notations]
1 [ ] Carriage
6 [ ] Recording Head
7 (7a, 7b, 7c, 7d) Subtank
8 [ ] Cartridge Holder
9 (9a, 9b, 9c, 9d) Maine tank (ink cartridge)
10 [ ] Ink Supply Tube
21 [ ] Air Booster Pump
22 [ ] Pressure Regulating Valve
23 [ ] Pressure Sensor
24 [ ] Ink Pack
25 [ ] Pressure Room
26 [ ] Ink Supply Bulb
41 [ ] Upper Case
42 [ ] Bottom Case
42c, 42d Projection for heat joining
50 [ ] Plug (Ink Derivation Opening)
51 [ ] Opening Hole (Positioning Means)
52 [ ] Pressurization Air Induction Inlet
53 [ ] Circuit Board
53a [ ] a through tube
53b [ ] a notch hole

53c [ ] an electrode contact (connection terminal)
55 [ ] Attachment
54 [ ] Semi-conductor Storage Means
56 [ ] Gage Pin
57 [ ] Ink Delivery Tube
58 [ ] Pressurization Air Sending-Out Opening
59 [ ] Terminal Device

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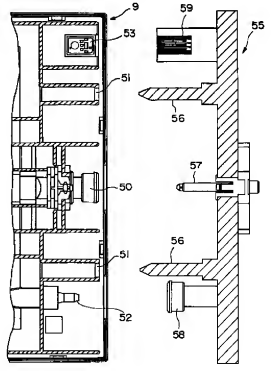
(54)【発明の名称】　記録装置用インクカートリッジおよびインクジェット式記録装置

(57)【要約】
【課題】　インクカートリッジをカートリッジホルダに装着する場合における機構的および電気的な各接続機構の位置合わせの精度を向上させること。
【解決手段】　内部にインクが封入されたインクパックは、カートリッジケース内に導入される加圧空気の作用によって、記録装置側にインクが導出されるように構成されている。またカートリッジケースの一部には、当該カートリッジ内に封入されたインクを管理するためのデータ記憶手段を備えた回路基板５３が配置されている。そして、ケースの一面には、記録装置へ装填する場合の位置決め手段としての一対の開口穴５１、インクパックからのインク導出口５０、加圧空気の導入口５２、およびデータ記憶手段を備えた前記回路基板５３の接続端子が集中的に配置されている。



【特許請求の範囲】
【請求項１】　可撓性素材により形成され、内部にインクが封入されたインクパックと、前記インクパックを収納し、気密状態に形成されたカートリッジケースとにより構成され、記録装置への装填状態において前記ケース内に加圧空気が導入されるように成された記録装置用インクカートリッジであって、
前記カートリッジケースの一面に、記録装置へ装填する場合の位置決め手段、
インクパックからのインク導出口、加圧空気の導入口、およびデータ記憶手段を備えた回路基板の接続端子を配置してなる記録装置用インクカートリッジ。
【請求項２】　前記位置決め手段は、記録装置に配置された位置決めピンを包囲することができるように形成された開口穴により構成した請求項１に記載の記録装置用インクカートリッジ。
【請求項３】　前記位置決め手段を構成する開口穴が、ケースの前記一面における長手方向に沿った２か所に配置されてなる請求項２に記載の記録装置用インクカートリッジ。
【請求項４】　前記２か所に配置された各開口穴のほぼ中間部にインクパックからのインク導出口が配置されてなる請求項３に記載の記録装置用インクカートリッジ。
【請求項５】　前記２か所に配置された各開口穴の両外側に、回路基板の接続端子および加圧空気の導入口がそれぞれ配置されてなる請求項３または請求項４に記載の記録装置用インクカートリッジ。
【請求項６】　請求項１乃至請求項５のいずれかに記載のインクカートリッジが装着されるインクジェット式記録装置であって、
前記カートリッジケースの一面に配置された位置決め手段を利用してインクカートリッジを装填した状態において、前記インク導出口に対して回路基板の接続端子が重力方向の上部に位置するように構成したインクジェット式記録装置。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】本発明は、インクジェット式記録装置に用いられ、空気加圧ポンプにより生成される空気圧を印加することにより、記録ヘッド側にインクを供給するように構成されたインクカートリッジおよびこれを用いるインクジェット式記録装置に関する。
【０００２】
【従来の技術】インクジェット式記録装置は、一般にキャリッジ上に搭載されて記録用紙の幅方向に移動するインクジェット式記録ヘッドと、記録用紙を記録ヘッドの移動方向に対して直行する方向に相対的に移動させる紙送り手段が備えられ、印刷データに基づいて記録ヘッドよりインク滴を吐出させることにより記録用紙に対して印刷が行われる。
【０００３】一方、例えばオフィス向けまたは業務用に提供されるこの種の記録装置においては、比較的大量の印刷に対応させるために、大容量のインクカートリッジを配備する必要が生じ、このためにインクカートリッジを、例えば装置本体側に配置されたカートリッジホルダに装填させる形式の記録装置が提供されている。そして、記録ヘッドが搭載されたキャリッジ上にはサブタンクが配置され、前記各インクカートリッジから各サブタンクに対してインク補給チューブを介してそれぞれインクを補給し、さらに各サブタンクからそれぞれ記録ヘッドに対してインクを供給するように構成されている。
【０００４】
【発明が解決しようとする課題】ところで、昨今においてはより大きな紙面に対して印刷を行うことが可能な、キャリッジの走査距離の長い大型の記録装置が要求されている。このような記録装置においては、スループットを向上させるために、記録ヘッドにおいては並々多ノズル化が図られている。さらに、スループットを向上させるために、印刷を実行しながらインクカートリッジからキャリッジに搭載された各サブタンクに対して逐次インクを補給することを可能とし、各サブタンクからそれぞれ記録ヘッドに対してインクを安定して供給するような記録装置が求められる。
【０００５】このような記録装置においては、インクカートリッジからサブタンクに対して、それぞれのインクに対応してインク補給チューブを接続する必要があり、キャリッジの走査距離が大きいために必然的にチューブの引き回し距離が増大する。しかも前記したとおり、記録ヘッドにおいては多ノズル化が図られているために、インクの消費量が多く、インクカートリッジからサブタンクに接続された各インク補給チューブ内においてインクの動圧（圧力損失）が高まり、サブタンクに対するインクの補給量が不足するという技術的課題を抱えている。
【０００６】このような課題を解決するための一つの手段として、例えばインクカートリッジ側に空気圧を印加し、インクカートリッジからサブタンクに対して空気圧によって強制的なインク流を発生させて、サブタンクに対して必要十分なインクを補給する構成が採用し得る。
【０００７】前記したような構成の記録装置に用いられるインクカートリッジとしては、外郭を構成するケースが気密状態となるように成形され、その内部にインクを封入した可撓性素材により形成されたインクパックが収納された構成が好適に採用し得る。このような構成におけるインクカートリッジにおけるインクパックは、ケース内に印加される加圧空気によってインクが押し出され、キャリッジに搭載された記録ヘッド側に送り出されるように作用する。
【０００８】一方、近年においては、この種の記録装置の適用範囲が拡大され、より高精細な印刷画質が求めら

れるなどの多様化が進んでいる。これに伴って、記録装置に用いられるインクの種類も多様化され、印刷内容に応じてカートリッジを交換して印刷を実行するなどの運用が成されるに至っている。したがって、各インクカートリッジのインクの種類や残量などを管理するために、データの読み出し書き込みが可能な半導体記憶手段を搭載したインクカートリッジの提案も成されている。

【０００９】したがって、前記したように加圧空気を導入してインクを送り出す機能と、半導体記憶手段を搭載して記録装置本体との間でデータの授受を実行するようなインクカートリッジを用いる場合、これを記録装置のカートリッジホルダに装填した場合において、加圧空気の導入と同時にインクの導出を可能にし、さらに半導体記憶手段とのデータの授受を行なうために回路基板の接続等も同時に成される構成が必要になる。

【００１０】この場合、機構的および電気的な幾つかの接続を成させるために、カートリッジをホルダ内に装填する場合における位置決めの精度が重要な課題となる。また、加圧空気により強制的にインクを押し出す機能を有しているために、何らかの障害によりインク漏れ等が発生しても、前記した回路基板の接続端子部分を汚染させるなどの問題を効果的に回避する手段を講ずる必要がある。

【００１１】本発明は、このような技術的な課題に基づいてなされたものであり、機構的および電気的な接続を確実になされる位置決め機構を提供すると共に、何らかの障害を受けてカートリッジからインク漏れが発生しても回路基板の接続端子部分の汚染を効果的に回避することができるインクカートリッジおよびこれを用いるインクジェット式記録装置を提供することを目的とするものである。

【００１２】

【課題を解決するための手段】前記した目的を達成するためになされた本発明にかかる記録装置用インクカートリッジは、可撓性素材により形成され、内部にインクが封入されたインクパックと、前記インクパックを収納し、気密状態に形成されたカートリッジケースとにより構成され、記録装置への装填状態において前記ケース内に加圧空気が導入されるように成された記録装置用インクカートリッジであって、前記カートリッジケースの一面に、記録装置へ装填する場合の位置決め手段、インクパックからのインク導出口、加圧空気の導入口、およびデータ記憶手段を備えた回路基板の接続端子を配置した構成とされる。

【００１３】この場合、前記位置決め手段は、好ましくは記録装置に配置された位置決めピンを包囲することができるように形成された開口穴により構成される。そして、好ましい実施の形態においては、前記位置決め手段を構成する開口穴が、ケースの前記一面における長手方向に沿った２か所に配置され、各開口穴のほぼ中間部にインクパックからのインク導出口が配置された構成とされる。さらに、好ましくは２か所に配置された各開口穴の両外側に、回路基板の接続端子および加圧空気の導入口がそれぞれ配置された構成とされる。

【００１４】以上のように構成されたインクカートリッジによると、カートリッジケースの一面に、記録装置へ装填する場合の位置決め手段が配置され、同じく前記一面に、インクパックからのインク導出口、加圧空気の導入口、およびデータ記憶手段を備えた回路基板の接続端子が集中して配置されているので、位置決め手段によってカートリッジケースの前記一面が位置決めされることにより、機構的および電気的な各接続機構の位置合わせも正確になされ、位置決め精度を向上させることができる。

【００１５】そして、カートリッジケースに施される前記位置決め手段は、記録装置に配置された位置決めピンを包囲することができるように形成された開口穴により構成され、この開口穴がケースの前記一面における長手方向に沿った２か所に配置された構成とされるので、記録装置に配置される２本の位置決めピンとの作用により、カートリッジの三次元方向の位置決めを達成することができる。

【００１６】一方、前記したインクカートリッジが装填されるインクジェット式記録装置においては、カートリッジケースの一面に配置された前記位置決め手段を利用してインクカートリッジを装填した状態において、インク導出口に対して回路基板の接続端子が重力方向の上部に位置するように構成される。

【００１７】このような位置関係をもって記録装置に対してカートリッジが装填されるので、何らかの障害を受けてカートリッジのインク導出口よりインク漏れが発生しても、回路基板の接続端子部分は漏洩インクによる汚染から回避することができる。したがって、記録装置の正常な動作を確保することができ、信頼性に優れた記録装置を提供することに寄与できる。

【００１８】

【発明の実施の形態】以下、本発明にかかるインクカートリッジを利用する記録装置について、図に示す実施の形態に基づいて説明する。まず図１は、記録装置の基本構成を平面図で示したものである。図１における符号１はキャリッジを示し、このキャリッジ１はキャリッジモータ２によって駆動されるタイミングベルト３を介し、走査ガイド部材４に案内されて紙送り部材５の長手方向、すなわち記録用紙の幅方向である主走査方向に往復移動されるように構成されている。そして、図１には示されていないが、キャリッジ１の紙送り部材５に対向する面には、後述するインクジェット式記録ヘッド６が搭載されている。

【００１９】また、キャリッジ１には前記記録ヘッドにインクを供給するためのサブタンク７ａ～７ｄが搭載さ

れている。このサブタンク７ａ～７ｄは、この実施の形態においては、その内部において各インクを一時的に貯留するために、それぞれのインクに対応して４個具備されている。そして、この各サブタンク７ａ～７ｄには、装置本体に配置されたカートリッジホルダ８に装填されたインクカートリッジとしてのメインタンク９ａ～９ｄから、可撓性のインク補給チューブ１０，１０，……をそれぞれ介して、ブラック、イエロー、マゼンタおよびシアンの各インクが供給されるように構成されている。なお、前記したインクカートリッジとしての各メインタンク９ａ～９ｄは、後で詳細に説明するようにその外郭構成が偏平状に形成されており、前記カートリッジホルダ８において、偏平状の面がそれぞれ垂直方向に向くように、いわゆる縦置き状態で装着されている。

【００２０】一方、前記キャリッジ１の移動経路上における非印字領域（ホームポジション）には、記録ヘッドのノズル形成面を封止することができるキャッピング手段１１が配置されており、さらにこのキャッピング手段１１の上面には、前記記録ヘッドのノズル形成面を封止し得るゴム等の可撓性素材により形成されたキャップ部材１１ａが配置されている。そして、キャリッジ１がホームポジションに移動したときに、前記キャップ部材１１ａによって、記録ヘッドのノズル形成面を封止することができるように構成されている。

【００２１】このキャップ部材１１ａは、記録装置の休止期間中において記録ヘッドのノズル形成面を封止し、ノズル開口の乾燥を防止する蓋体として機能する。また、このキャップ部材１１ａには、図には示されていないが、吸引ポンプ（チューブポンプ）におけるチューブの一端が接続され、吸引ポンプによる負圧を記録ヘッドに作用させて、記録ヘッドからインクを吸引排出させるクリーニング動作が実行されるように構成されている。そして、キャッピング手段１１の印字領域側に隣接して、ゴムなどの弾性素材によるワイピング部材１２が配置されていて、必要に応じて記録ヘッドのノズル形成面を払拭して清掃することができるように構成されている。

【００２２】次に図２は、図１に示した記録装置に搭載されたインク供給システムの構成を模式的に示したものであり、このインク供給システムについて、それぞれ相当する各部を同一符号で示した図１と共に説明する。図１および図２において、符号２１は空気加圧ポンプを示しており、この空気加圧ポンプ２１により加圧された空気は、圧力調整弁２２に供給され、さらに圧力検出器２３を介して前記した各メインタンク９ａ～９ｄ（図２においては代表して符号９として示しており、以下において代表して単に符号９として説明する場合もある。）にそれぞれ供給されるように構成されている。なお、前記圧力調整弁２２は、空気加圧ポンプ２１によって加圧された空気圧が所定以上に達した時に、圧力を開放して各メインタンク９ａ～９ｄに加わる空気圧を所定の範囲に維持させる機能を有している。

【００２３】さらに、前記圧力検出器２３は、空気加圧ポンプ２１によって加圧された空気圧を検知し、空気加圧ポンプ２１の駆動を制御するように機能する。すなわち、空気加圧ポンプ２１によって加圧された空気圧が所定の圧力に達したことを検出した場合には、空気加圧ポンプ２１の駆動を停止させると共に、圧力検出器２３によって空気圧が定められた圧力以下となったことを検出した場合には、空気加圧ポンプ２１を駆動させるように制御する。したがって、この繰り返しによって前記した各メインタンク９ａ～９ｄに加わる空気圧は所定の範囲に維持されるようになされる。

【００２４】前記メインタンク９としてのインクカートリッジの詳細な構成については後述するが、その概略構成は図２に示されたように、その外郭ケースが気密状態に形成されており、その内部にはインクを封入した可撓性素材により形成されたインクパック２４が収納されている。そして、メインタンク９とインクパック２４とで形成される空間が圧力室２５を構成しており、この圧力室２５内に、前記圧力検出器２３を介した加圧空気が供給されるように構成されている。

【００２５】この構成により、各メインタンク９ａ～９ｄに収納された各インクパック２４は、それぞれ加圧空気による加圧を受け、各メインタンク９ａ～９ｄから各サブタンク７ａ～７ｄに対して所定の圧力によるインク流が発生するように成される。

【００２６】なお、前記各メインタンク９ａ～９ｄにおいて加圧されたインクは、それぞれ各インク補給バルブ２６，２６……および各インク補給チューブ１０，１０，……をそれぞれ介して、キャリッジ１に搭載された各サブタンク７ａ～７ｄ（図２においては代表して符号７として示しており、以下において代表して単に符号７として説明する場合もある。）に供給されるように構成されている。

【００２７】図２に示すように、サブタンク７には内部にフロート部材３１が配置されており、そのフロート部材３１の一部には永久磁石３２が取り付けられている。そしてホール素子に代表される磁電変換素子３３ａ，３３ｂが基板３４に装着されて、サブタンク７の側壁に添接されている。この構成により、フロート部材３１に配置された永久磁石３２と、フロート部材の浮上位置にしたがった前記永久磁石３２による磁力線量に応じて、前記ホール素子３３ａ，３３ｂにより電気的出力が発生されるインク量検出手段を構成している。

【００２８】したがって、例えばサブタンク７内のインク量が少なくなった場合には、サブタンク内に収納されたフロート部材３１の位置が重力方向に移動し、これに伴い前記永久磁石３２の位置も重力方向に移動する。それ故、永久磁石の移動によるホール素子３３ａ，３３ｂ

の電気的出力は、サブタンク７内のインク量として感知することができ、ホール素子３３ａ，３３ｂにより得られた電気的出力によって、前記インク補給バルブ２６が開弁される。

【００２９】これにより、メインタンク９内で加圧されているインクは、インク量が低下したそれぞれのサブタンク７内に個別に送出される。そして、当該サブタンク７内におけるインク量が所定の容量に達した場合には、前記したホール素子３３ａ，３３ｂの電気的出力に基づいて、前記インク補給バルブ２６が閉弁される。このような繰り返しにより、メインタンクからサブタンクに対して断続的にインクが補給されるように作用し、各サブタンク内には常にほぼ一定の範囲のインクが貯留されるようになされる。

【００３０】そして、各サブタンク７からはバルブ３５およびこれに接続されたチューブ３６を介して記録ヘッド６に対してインクが供給されるように構成されており、記録ヘッド６の図示せぬアクチュータに供給される印刷データに基づいて、記録ヘッド６のノズル形成面に形成されたノズル開口６ａより、インク滴が吐出されるように作用する。なお、図２において符号１１は、前記したキャッピング手段を示しており、このキャッピング手段１１に接続されたチューブは図示せぬ吸引ポンプ（チューブポンプ）に接続されている。

【００３１】図３乃至図５は、以上のように構成されたインクジェット式記録装置に用いられるインクカートリッジとしての前記したメインタンク９の例を示したものである。なお、図３はメインタンクの全体構成を示した斜視図であり、図４は図３に示すＡ－Ａ線から矢印方向に視た状態のメインタンクの拡大断面図である。また、図５は図３に示す外郭ケース内に収納されたインクパック２４の構成を示した斜視図である。まず、図３および図４に示すように外郭ケースは、上ケース４１および下ケース４２により構成されている。その下ケース４２は偏平状の函型形状になされており、上面が開放されてその内部にはインクを封入した状態のインクパック２４（図５参照）が収納できるように構成されている。

【００３２】この実施の形態においては、図４に示されたように下ケース４２に収納されたインクパック２４の各四辺を押さえるために、中央部が窓状に開口された四辺形の中蓋４３が挿入されており、さらに下ケース４２の開口端縁に形成された鍔部４２ａおいて、太線で示したようにフィルム部材４４が熱溶着されて、下ケース４２が気密状態となるように閉塞されている。そして、その上部から偏平函型形状に成された上ケース４１が装着された構成とされている。

【００３３】前記上ケース４１には、その内面に沿って楔形の爪部４１ａが開欠的に形成されており、上ケース４１を下ケース４２に対して押し込むことにより、前記各爪部４１ａが下ケース４２の開口端縁に形成された前記鍔部４２ａに係合し、両者は一体に結合される。この構成によって、フィルム部材４４により閉塞された下ケース４２内に加圧空気が導入された場合、フィルム部材４４は上ケース４１の内面に沿って添接するようにして位置しているので、加圧空気を受けてフィルム部材４４が外側に膨出するのを避けることができる。

【００３４】図５は前記のようにして形成される外郭ケース内に収納されたインクパック２４の構成を示したものである。このインクパック２４は、矩形状に形成された２枚の可撓性素材、例えばポリエチレンフィルム外用いられ、ガスバリア性の向上のために、例えばアルミ泊等が表面にラミネートされている。そして、長手方向の側端部におけるほぼ中央部にはインク導出口を構成する栓体５０が取り付けられている。

【００３５】前記栓体５０が取り付けられた側端部と、これに直交する長手方向の両側端部の三辺が、まず熱溶着によって接合されて袋状に形成される。なお、符号２４ｂは前記三辺に施された熱溶着部分を示す。そして、前記のようにして袋状に形成されたインクパック２４における残りの一辺における開口を利用して、インクパック２４内にインクが導入され、最後に残りの一辺が熱溶着によって接合されて、インクパック内にインクが封入された状態とされる。なお、符号２４ｃは前記残りの一辺に施された熱溶着部分を示す。

【００３６】以上のように構成されたインクカートリッジとしてのメインタンク９は、図３に示されたように、カートリッジケースの一面に、記録装置へ装填する場合に利用される位置決め手段としての一対の開口穴５１が形成されている。この一対の開口穴５１は、ケースの前記一面における長手方向に沿った２か所に離間した状態で配置されており、これは下ケース４２を例えば射出成形する場合において、同時に一体に形成されている。また、前記２か所に配置された位置決め開口穴５１のほぼ中間部に、インクパックからのインク導出口を構成する前記栓体５０が、図示せぬ気密用のＯリングを噛んだ状態で取り付けられている。

【００３７】そして、前記２か所に配置された各開口穴５１の両外側には、加圧空気の導入口５２、および後で詳細に説明する回路基板５３がそれぞれ配置されている。なお、加圧空気の導入口５２は、下ケース４２を成形する場合において同時に中空状に一体に成形され、これを介してフィルム部材４４により閉塞された下ケース４２内に加圧空気が導入できるように構成されている。

【００３８】図６には、前記したように形成されたインクカートリッジとしてのメインタンク９の前記一面側の端部が断面状態で示されており、記録装置側のカートリッジホルダ８に配置された接続機構５５に対してメインタンク９が装着される状態を示している。また図７には カートリッジホルダ８側に配置された接続機構５５が斜視図の状態で示されている。図６および図７に示すよう

に、カートリッジホルダ８側には、円柱状に形成された一対の位置決めピン５６が配置されており、メインタンク９側に形成された前記一対の位置決め開口穴５１が、各位置決めピン５６を包囲して装着されるように構成されている。

【００３９】このように、カートリッジ側に位置決め用の開口穴５１がメインタンクの前記一面における長手方向に沿った２か所に配置された構成とされているので、記録装置側に配置された２本の位置決めピン５６の基端部への装着により、カートリッジとしてのメインタンク９の三次元方向の位置決めを達成することができる。前記位置決めピン５６に対してメインタンク９が装着されることによって、一対の位置決めピン５６を挟むほぼ中央部に配置された中空状のインク導出管５７が、インクパックからのインク導出口を構成する前記栓体５０に差し込まれ、カートリッジからインクが導出できる態勢となされる。

【００４０】また、メインタンク９の装着により、加圧空気の導入口５２がホルダ８側に配置された加圧空気の送出口５８に接続され、メインタンク９側に加圧空気が導入することができる態勢になされる。さらに、メインタンク９側に配置された前記回路基板５３に対して複数の接触片を備えた端子機構５９が接続され、回路基板５３に備えられた後述する半導体記憶手段との間で、データの授受が実現できる態勢になされる。なお、メインタンク９をカートリッジホルダ８に装着した場合においては、図６に示すようにメインタンク９側に配置された前記回路基板５３が重力方向にして上部に位置する縦置き状態に装着される。

【００４１】図８はメインタンク９の装着により、ホルダ側に配置された中空状のインク導出管５７が、インクパックからのインク導出口を構成する前記栓体５０に差し込まれ、カートリッジからインクが導出できるようになされる状態を断面図によって示したものである。なお、図８（Ａ）は両者が接続される以前の状態を示し、また図８（Ｂ）は両者が接続された状態を示している。インクパック側の前記栓体５０内の出口部分には、円環状に形成されたゴムパッキン５０ａが嵌め込まれている。一方、栓体５０内には、軸方向に可動できるようになされた可動体５０ｂが収納されている。そして前記可動体５０ｂは、コイル状のバネ部材５０ｃの付勢力によって、前記ゴムパッキン５０ａにおける円環状の中央部を閉塞するように構成されている。また、ホルダ８側に配置された中空状のインク導出管５７には、先端部近傍の側面に開口５７ａが形成されている。

【００４２】したがって、カートリッジとしてのメインタンク９が記録装置側に装着されない図８（Ａ）の状態においては、コイル状のバネ部材５０ｃの付勢力によって、可動体５０ｂはゴムパッキン５０ａにおける円環状の中央部を閉塞するため栓体５０は閉弁状態とされ、インクパックからのインクの漏出を阻止することができる。またメインタンク９が記録装置に装着された場合には、図８（Ｂ）に示すように、インク導出管５７の先端部が前記バネ部材５０ｃの付勢力に抗して可動体５０ｂを内部に押むように作用するため、矢印で示したインク流路が形成され、インクが導出されるようになされる。なおこの場合、ゴムパッキン５０ａにおける円環状の内径部が、インク導出管５７の外形部に密着し、当該部分からのインクの漏出が阻止できるようになされる。

【００４３】次に図９は、カートリッジ側に配置された前記回路基板５３の装着状態を示しており、また、図１０は回路基板５３の外観構成を示している。なお、図１０における（Ａ）は回路基板５３を正面側から視た斜視図で示しており、また（Ｂ）は回路基板５３を裏面側から視た斜視図で示している。図９に示されたように、回路基板５３はカートリッジの下ケース４２の隅角部において、直交する二面が開放された内底部に取り付けられている。その開放された一面は、回路基板５３が前記カートリッジホルダ８側に配置された端子機構５９に接続できるようになされるものであり、また開放された他の一面は、主に回路基板５３をカートリッジケースに装着する場合において利用される。

【００４４】すなわち、回路基板には図１０に示すように回路基板５３を下ケース４２に装着するための貫通孔５３ａおよび切欠き孔５３ｂが形成されている。そして下ケース４２には、図１０（Ａ）に仮想線で示したように前記貫通孔５３ａおよび切欠き孔５３ｂに挿通する熱溶着用の突起４２ｃおよび４２ｄが予め形成されている。ほぼ矩形状に形成された前記回路基板５３を下ケース４２に装着するに際しては、図９に示されたように回路基板を位置決めするために形成された凹陥部４２ｂに回路基板５３が嵌め込まれる。そして、図１０（Ａ）に仮想線で示した熱溶着用の突起４２ｃおよび４２ｄの頂部に、図示せぬヒータチップを当接させて熱溶融することにより、回路基板５３は図９に示されたように下ケース４２に装着することができる。

【００４５】このようにして、回路基板５３を下ケース４２に装着するために、装着用の治具として前記したヒータチップが用いられ、回路基板５３の上面側においては開放された一面より前記ヒータチップの先端が挿入されるようになされる。なお、図１０（Ａ）に示すように、回路基板５３の正面側には、カートリッジホルダに装着された場合に、ホルダ８側の前記端子機構５９と電気的に接触される接続端子としての電極接点５３ｃが形成されている。また、同一面には円形状に形成されたチェック用の電極接点５３ｄも形成されている。

【００４６】そして、これらの電極接点５３ｃ，５３ｄは、回路基板５３の裏面に配置されたデータの読み出し書き込みが可能な半導体記憶手段５４に接続されており、メインタンク９を記録装置のカートリッジホルダに

装着した状態において、メインタンク封入された例えば、インクの種類、インク残量、シリアル番号や有効期限等のデータの授受がなされるように構成されている。

【００４７】

【発明の効果】以上の説明で明らかなように、本発明にかかる記録装置用インクカートリッジによると、カートリッジケースの一面に、記録装置へ装填する場合の位置決め手段が配置され、同じく前記一面に、インクパックからのインク導出口、加圧空気の導入口、およびデータ記憶手段を備えた回路基板の接続端子が集中して配置されているので、位置決め手段によってカートリッジケースの前記一面が位置決めされることにより、機構的および電気的な接続機構の位置合わせも正確になされる。これにより位置決め精度を向上させることができ、この種の記録装置の動作の信頼性を向上させることができる。

【００４８】また、本発明にかかるインクジェット式記録装置によると、カートリッジケースの一面に配置された前記位置決め手段を利用してインクカートリッジを装填した状態において、インク導出口に対して回路基板の接続端子が重力方向の上部に位置するように成されるので、何らかの障害を受けてインク導出口よりインク漏れが発生しても、回路基板の接続端子部分は漏洩インクによる汚染から回避することができる。したがって、記録装置の正常な動作を確保することができる。

【図面の簡単な説明】

【図１】本発明にかかるインクカートリッジを使用し得るインクジェット式記録装置の一例を示した上面図である。

【図２】図１に示す記録装置におけるインクカートリッジから記録ヘッドに至るインク供給システムを示した模式図である。

【図３】本発明にかかるインクカートリッジの外観構成を示した斜視図である。

【図４】図３に示すＡ－Ａ線から矢印方向に視た状態のインクカートリッジの拡大断面図である。

【図５】図３に示したカートリッジ内に収納されたインクパックの構成を示した斜視図である。

【図６】インクカートリッジの一面側の端部およびカートリッジホルダに配置された接続機構の構成を示した断面図である。

【図７】カートリッジホルダに配置された接続機構を示した斜視図である。

【図８】カートリッジ側のインク導出栓と、カートリッジホルダ側のインク導出管との構成を示した断面図である。

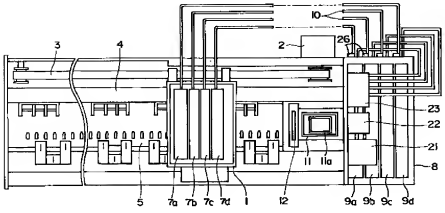
【図９】カートリッジ側に装着された回路基板の装着状態を拡大して示した斜視図である。

【図１０】図９に示された回路基板の外観構成をさらに拡大して示した斜視図である。

【符号の説明】

１	キャリッジ
６	記録ヘッド
７（７ａ，７ｂ，７ｃ，７ｄ）	サブタンク
８	カートリッジホルダ
９（９ａ，９ｂ，９ｃ，９ｄ）	メインタンク（インクカートリッジ）
１０	インク補給チューブ
２１	空気加圧ポンプ
２２	圧力調整弁
２３	圧力検出器
２４	インクパック
２５	圧力室
２６	インク補給バルブ
４１	上ケース
４２	下ケース
４２ｃ，４２ｄ	熱溶着用突起
５０	栓体（インク導出口）
５１	開口穴（位置決め手段）
５２	加圧空気導入口
５３	回路基板
５３ａ	貫通孔
５３ｂ	切欠き孔
５３ｃ	電極接点（接続端子）
５５	接続機構
５４	半導体記憶手段
５６	位置決めピン
５７	インク導出管
５８	加圧空気送出口
５９	端子機構

【図１】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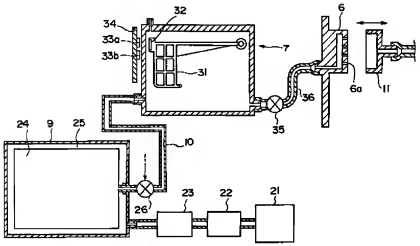
26
3
4
23
22
21
8
11
11a
5
7a
7b
7c
7d
1
12
9a
9b
9c
9d

【図２】


32
34
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7
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6a
11
36
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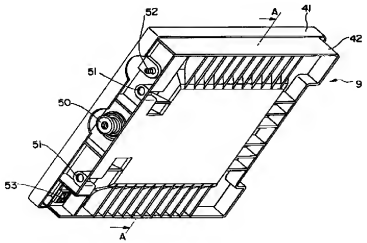
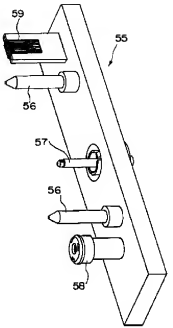
24
9
25
10
26
23
22
21

【図３】


52
A
41
42
51
9
50
51
53
A

【図７】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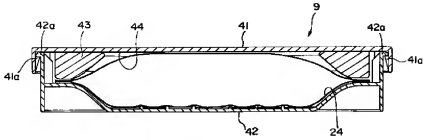
【図４】


9
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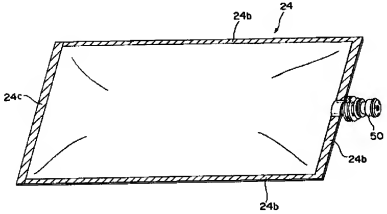
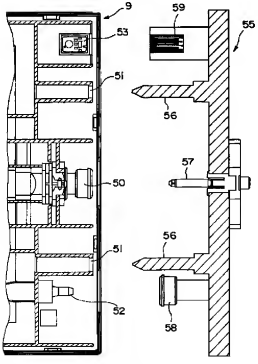
44
41
42a
41a
41a
42
24

【図５】


24b
24
24c
50
24b
24b

【図６】


9
59
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53
51
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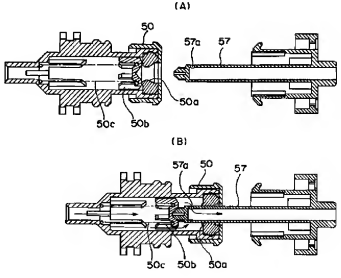
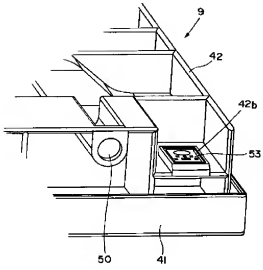
58

【図８】


(A)
50
57a
57
50a
50c
50b
(B)
57a
50
57
50c
50b
50a

【図９】



【図１０】